Claims

[c1] 1. A fiber splice tray for use in an optical fiber hydrophone module, the module comprising an optical fiber hydrophone assembly and terminating with an intermodule mechanical coupling, the hydrophone assembly comprising a plurality of mandrels helically wrapped with optical fiber and connected in linear relation, the fiber splice tray comprising:

a housing having a top portion, a bottom portion, and a longitudinal axis;

the bottom portion having at least one opening at each end through which the optical fiber passes, the bottom portion further comprising an internal groove for housing the fiber;

the internal groove comprising first and section opposing parallel sections that are parallel to the longitudinal axis and the opposing parallel sections each having a first end and a second end, the first ends of each section proximate to each other and the second ends of each section proximate to each other, and proximate to both ends of the parallel sections a first arc and a second arc connecting the first end of one parallel section to the first end of the other parallel section, whereby there are two continuous looped alternative fiber paths of differing perimeters;

the top portion for mounting to the bottom portion for encapsulating the fiber; and

means for retaining the fiber splice tray in fixed position relative to the intermodule mechanical coupling

[c2] 2. A fiber splice tray as recited in claim 1, wherein the parallel sections

are adapted to receive a splinted fiber splice

[c3] 3. A fiber splice tray as recited in claim 1, wherein the second arc is closer to the center of the fiber splice tray than the first arc, whereby the perimeter defined by the parallel sections and the first arcs is greater than the perimeter defined by the parallel sections and the second arcs.

[c4] 4. A fiber splice tray as recited in claim 3, wherein the radii of the first and second arcs are the same.

[c5] 5. A fiber splice tray as recited in claim 3, wherein the radius of the second arc is greater than the radius of the first arc.

[c6] 6. A fiber splice tray as recited in claim 3, wherein the radius of the first arc is greater than the radius of the second arc.

[c7] 7. A fiber splice tray as recited in claim 1, wherein the internal groove further comprises two crossing sections, one crossing section extending from proximate to the first end of the first parallel section to the second end of the second parallel section, and the other crossing section extending from proximate to the first end of the second parallel section to the second end of the first parallel section, whereby the crossing sections cross each other and are alternative paths to the parallel sections.

[c8] 8. A fiber splice tray as recited in claim 1, wherein the fiber splice tray is disposed at least in part within the intermodule mechanical coupling and the means for retaining the fiber splice tray comprises restraining the tray with adjacent elements in the intermodule mechanical coupling.

[c9] 9. A fiber splice tray as recited in claim 1, wherein the bottom portion has one opening at each end for receiving sensing fibers from within a hydrophone assembly and one opening at each end for receiving bypass fibers.

[c10] 10. A fiber splice tray as recited in claim 1, wherein the radii of the arcs are no greater than 0.3 inches.

[c11] 11. A fiber splice tray as recited claim 1, wherein the fiber enters the splice tray openings in tubes.

[c12] 12. A fiber splice tray as recited in claim 11, wherein the tubes are secured at the openings with compressive stops.

[c13] 13. A fiber splice tray as recited in claim 11, wherein the tubes are PTFE.

[c14] 14. A fiber splice tray as recited in claim 1, wherein the fiber splice tray is stainless steel.

[c15] 15. A fiber splice tray for use in an optical fiber hydrophone module, the module comprising an optical fiber hydrophone assembly and terminating with an intermodule mechanical coupling, the hydrophone assembly comprising a plurality of mandrels helically wrapped with optical fiber and connected in linear relation, the fiber splice tray comprising:

a housing having a top portion, a bottom portion, and a longitudinal axis; the bottom portion having at least one opening at each end through which the optical fiber passes, the bottom portion further comprising an

internal groove for housing the fiber;

the internal groove comprising first and section opposing parallel sections that are parallel to the longitudinal axis and the opposing parallel sections adapted to receive a splinted fiber splice, each parallel section having a first end and a second end, the first ends of each section proximate to each other and the second ends of each section proximate to each other, and proximate to both ends of the parallel sections a first arc and a second arc connecting the first end of one parallel section to the first end of the other parallel section, wherein the second arc is closer to the center of the fiber splice tray than the first arc, whereby the perimeter defined by the parallel sections and the first arcs is greater than the perimeter defined by the parallel sections and the second arcs;

the top portion for mounting to the bottom portion for encapsulating the fiber; and

means for retaining the fiber splice tray in fixed position relative to the intermodule mechanical coupling.

[c16] 16. A fiber splice tray as recited in claim 15, wherein the internal groove further comprises two crossing sections, one crossing section extending from proximate to the first end of the first parallel section to the second end of the second parallel section, and the other crossing section extending from proximate to the first end of the second parallel section to the second end of the first parallel section, whereby the crossing sections cross each other and are alternative paths to the parallel sections.

[c17] 17. An optical fiber hydrophone module comprising:

an optical hydrophone assembly comprising a plurality of mandrels helically wrapped with optical fiber and connected in linear relation;

an intermodule mechanical coupling proximate to an end of the hydrophone assembly;

a fiber splice tray comprising a housing having a top portion, a bottom portion, and a longitudinal axis, and disposed at least in part within the intermodule mechanical coupling;

the fiber splice tray bottom portion having at least one opening at each end through which the optical fiber passes, the bottom portion further comprising an internal groove for housing the fiber;

the bottom portion internal groove comprising first and section opposing parallel sections that are parallel to the longitudinal axis and the opposing parallel sections each having a first end and a second end, the first ends of each section proximate to each other and the second ends of each section proximate to each other, and proximate to both ends of the parallel sections a first arc and a second arc connecting the first end of one parallel section to the first end of the other parallel section, whereby there are two continuous looped alternative fiber paths of differing perimeters;

the fiber splice tray top portion for mounting to the bottom portion for encapsulating the fiber; and

means for retaining the fiber splice tray in fixed position relative to the intermodule mechanical coupling.

[c18] 18. An optical fiber hydrophone module as recited in claim 17, wherein the fiber splice tray is disposed at least in part within the intermodule

mechanical coupling and the means for retaining the fiber splice tray comprises restraining the tray with adjacent elements in the intermodule mechanical coupling.

[c19] 19. A method for storing spliced fibers, splice sleeves, and excess fiber service length in a fiber splice tray for use in an optical fiber hydrophone module, the module comprising an optical fiber hydrophone assembly and terminating with an intermodule mechanical coupling, the hydrophone assembly comprising a plurality of mandrels helically wrapped with optical fiber and connected in linear relation, the steps comprising:

inserting the fiber into a housing, the housing having a longitudinal axis, a top portion, and a bottom portion, the bottom portion having at least one opening at each end through which the optical fiber passes and further comprising an internal groove;

wrapping fiber in the internal groove, the internal groove comprising first and section opposing parallel sections that are parallel to the longitudinal axis and the opposing parallel sections each having a first end and a second end, the first ends of each section proximate to each other and the second ends of each section proximate to each other, and proximate to both ends of the parallel sections a first arc and a second arc connecting the first end of one parallel section to the first end of the other parallel section, whereby there are two continuous looped alternative fiber paths of differing perimeters;

choosing paths in the internal groove along which to wrap the fiber;

aligning a splice or splice sleeve, if any, along one of the parallel sections; and inserting the fiber through an opening in the housing to exit

the fiber splice tray.

[c20] 20. A method for storing spliced fibers, splice sleeves, and excess fiber service length as recited in claim 19, further comprising the step of wrapping the fiber along a further alternative path, wherein the internal groove further comprises two crossing sections, one crossing section extending from proximate to the first end of the first parallel section to the second end of the second parallel section, and the other crossing section extending from proximate to the first end of the second parallel section to the second end of the first parallel section, whereby the crossing sections cross each other and are alternative paths to the parallel sections.